

***Sacramento River Chinook: Viability in the Face of Environmental Variability**

Curry Cunningham¹, Ray Hilborn², Noble Hendrix³, Robert Lessard⁴; 1) School of Aquatic and Fishery Sciences, University of Washington. curryc2@uw.edu 907-360-4217 Fax: 206-685-7471, University of Washington, School of Aquatic & Fishery Sciences, Box 355020. Seattle, WA 98195-5020; 2) School of Aquatic and Fishery Sciences, University of Washington. rayh@u.washington.edu 206-543-3587 Fax: 206-685-7471, University of Washington, School of Aquatic & Fishery Sciences, Box 355020. Seattle, WA 98195-5020; 3) R2 Resource Consultants, Inc.; Affiliate Faculty at University of Washington, nhendrix@r2usa.com 425-556-1288 Fax: 425-556-1290 15250 NE 95th Street. Redmond, WA 98052; 4) Columbia River Inter-Tribal Fish Commission lesr@critfc.org 503-238-0667 Fax: 503-235-4228, [729 Northeast Oregon Street, Portland, OR 97232](http://729NortheastOregonStreet.com)

Abstract: Chinook salmon (*Oncorhynchus tshawytscha*) populations spawning in the Sacramento River (CA) and its tributaries have demonstrated high variability, and in some cases significant declines in spawning abundance, during the past 40 years despite restrictions to commercial and recreational fishing activities. Concern over the sustainability of Sacramento River Chinook (SRC) populations has lead to their listing under the Endangered Species Act (Winter-run, “endangered”, 1994) and a desire to determine which environmental factors are directly influencing their survival in freshwater and marine environments. Environmental factors under investigation may be broadly categorized as: 1) the result of natural changes in marine productivity, or 2) arising from anthropogenic influences in the system including changes to water flow and temperature, access to rearing habitat, routing of fish passage and water exports or diversions of alternative uses. We are in the process of developing stage-structured population dynamics models that will permit hypotheses to be tested regarding the impact of environmental factors on productivity and capacity in various life-stages, the influence of hatchery production to the system, and competition amongst co-migrating and co-rearing natural and hatchery-produced groups. We have developed population-specific models for winter and spring-run and are currently developing a larger model that includes co-occurring populations of the previous two runs in addition to fall-run.

Statement of Relevance: The purpose of this research is to provide a quantitative framework for assessing the influence of both environmental and anthropogenic factors on the survival of threatened and endanger Chinook salmon populations in the Sacramento River, California, and a means for estimating future changes in abundance under alternative ecological and water use policy scenarios.